Clinical and cost-effectiveness of cognitive behaviour therapy for health anxiety in medical patients

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Abstract

Background

Health anxiety~~, commonly called hypochondriasis but having a broader definition,~~ has been treated by therapists expert in cognitive behaviour therapy (CBT) with some specific benefit in some patients. Those in hospital care have been less often investigated. Following a pilot trial suggesting efficacy we carried out a randomized study in hospital medical clinics.

Methods

We undertook a multicenter, randomised trial on health anxious patients attending out-patient clinics in secondary care. A computer-generated random scheme was used to allocate eligible medical patients to an active treatment group of 5-10 sessions of adapted CBT (CBT-HA) delivered by hospital-based therapists or to standard care in the clinics. The primary outcome was change in health anxiety symptoms measured by the Health Anxiety Inventory at one-year and the main secondary hypothesis was equivalence of total health and social care costs over two-years, with an equivalence margin of £150. Analysis was by intention to treat. The study is registered as ISRCTN14565822.

Findings

Findings

Of 28,991 patients screened, 219 were randomly assigned to- CBT-HA and 225 to a standard care arm. 205 and 212, respectively, were included in the analyses of the primary endpoints. At one-year, improvement in health anxiety in CBT-HA patients was 2.98 points greater than in the standard care group (95% confidence interval [CI], 1.64 to 4.33, P<0.001). Twice as many patients receiving CBT achieved normal levels of health anxiety compared to the control group (13.9% vs 7.3%). Similar differences were observed at six months and two years, and there were concomitant reductions in generalized anxiety and, to a lesser extent,

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depression. There were no significant differences in social functioning or health-related quality of life. ~~Despite e~~. Equivalence in total two-year costs was not ~~being~~ achieved, but the difference was not statistically significant (adjusted mean difference £156, ~~6~~95% CI -£1,446 to £1,758 ~~to £446~~, p=0.848) ~~(95% CI £1,758$1143 to 446$940, p=0.848~~.

Interpretation

This form of adapted CBT for health anxiety led to sustained symptomatic benefit over a two-year period, with no significant impact on total costs. ~~with treatment costs offset by savings elsewhere.~~ It deserves wider application in medical care.

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Introduction

Health anxiety, together with its approximate synonym, hypochondriasis, is a common problem in the community (life-time prevalence 5%),[1] and in both primary and secondary care.[2-4] It places a substantial burden on health services[5] as the fear of having a serious disease leads to medical consultation, commonly followed by further investigations. Pathological health anxiety provokes considerable suffering but often goes unrecognised or appreciated only at a superficial ~~or even comical~~ level. Even when recognised, expensive investigations may be carried out unnecessarily because of fear of litigation. In general hospitals, between 10 and 20% of all attenders have abnormal health anxiety and this is often undetected as many patients have a history of previous medical illnesses so that their anxiety is seen as reasonable and proportionate. Patients often rotate between different clinics depending on the focus of their symptoms. Often symptoms last for years and show little tendency to spontaneous resolution. Psychological treatment in the form of cognitive behaviour therapy (CBT) delivered by expert therapists is of proven effectiveness for anxiety disorders,[6] its application to health anxiety has been shown to be effective relative to both waitlist and comparison psychological treatments. These studies were conducted mainly in primary and psychiatric care[7-9] with specialist therapists. In a pilot study carried out by our

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group, ~~More recently~~ these results have been shown to generalise to secondary medical care settings (where costs of care are high) using less expert therapists trained for the purpose.~~-~~[10]~~.~~ The CHAMP (cognitive behaviour therapy for health anxiety in medical patients) trial was subsequently set up to examine both efficacy and cost-effectiveness of a modified cognitive behavioural treatment for health anxiety (CBT-HA) with assessment of outcomes over a two-year period.

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Methods

CHAMP was a pragmatic randomized controlled trial with two parallel arms and equal randomization of eligible patients initially to 5-10 sessions of CBT-HA or to standard care in the clinics. Assessments of health anxiety, generalised anxiety, depression, social function, quality of life and costs were made over a two year period after randomization. The primary outcome was symptoms of health anxiety after one year. Those allocated to CBT-HA were treated by graduate research workers, nurses or other health professionals trained for this intervention. Our two main hypotheses, based upon the results of our pilot study,[10] were that (i) patients offered between 5 and 10 sessions of cognitive behaviour therapy focused on health anxiety, CBT-HA,[11] in addition to standard care would have lower levels of health anxiety measured by the Health Anxiety Inventory (HAI)[12] one year after randomis~~z~~ation to the trial than those treated with standard care alone, and (ii) from a ~~the overall~~ health and social care perspective, the costs of the CBT-HA and standard groups would be equivalent at 2 years (i.e. costs of CBT-HA would be offset by savings in other areas).

Secondary hypotheses were that health anxiety at other time points, generalised anxiety and depression, social functioning and quality of life measured by standard measures[13-15] would differ between CBT-HA and standard care and that CBT-HA would be a cost-effective use of resources.

Randomisation and masking

Eligible patients in whom consent was provided were allocated in a 1:1 ratio to the two arms of the study according to a computer-generated random sequence using block randomisation with varying blocksize of four and six. The allocation sequence was not available to any member of the research team until databases had been completed and locked.

Settings and procedure

Patients attending cardiology, endocrine, gastroenterology, neurology and respiratory medicine clinics, where health anxiety prevalence was known to be high,[4] in six general hospitals in the UK were considered for the study. All patients attending clinics of the collaborating consultants, apart from the specific exclusions below, were approached while waiting for their out-patient appointments and, after consent, given the short form of the HAI,[12] a self-rating scale of 14 questions that takes 5-10 minutes to complete. Those that scored 20 or more on the scale, an accepted cut-off point,[12] were given a brief summary of the trial and offered the opportunity of further assessment, and, if they were interested, were then given an information sheet about the study. Those that agreed in principle to take part were then asked the questions in the Structured Clinical Interview for DSM-IV[16] covering the diagnosis of hypochondriasis, all of which had to be answered positively to confirm the diagnosis. Those that satisfied the diagnosis of hypochondriasis were asked for written consent to take part and baseline assessments completed. This, through necessity, involved a standard explanation of the nature and significance of health anxiety and so constituted a small intervention in all patients who entered the trial.

After baseline assessment, randomization was carried out by an independently operated computerised system (using block randomization with no stratification in randomized blocks of four and six).

Interventions

Each patient in the CBT-HA arm of the trial was offered between 5 and 10 sessions of treatment initially but booster sessions were also allowed. Each therapist was supervised at 2-4 week intervals at least (by HS, GS, EM and SF) during treatment to ensure consistency in

treatment. Bias in follow-up assessments was reduced by replacing the research assessor with another research assistant if at any time they were unwittingly informed about the patient's allocation status.

Training and Fidelity of Intervention

Four collaborators (PS, GS, EM, and HS) trained the therapists at two workshops and also assessed treatment fidelity, together with HW. 50% of all treatment sessions were audio recorded. Fidelity was tested using the health anxiety modification of the Cognitive Therapy Rating Scale[17] (CTRS-HAV).[17] Recordings were assessed by the local supervisor and a random sample sent to a supervisor at a different site to assess the level of agreement, with further training ending only when an agreement level of 0.80 kappa was reached.

The study was approved by the North Nottingham Ethics Committee (08/H0403/56) prior to the start of data collection.

Inclusion and exclusion criteria

Those who satisfied the criteria for excessive health anxiety above were included if they were (i) aged between 16 and 75, (ii) permanently resident in the area, (iii) had sufficient understanding of English to read and complete study questionnaires, and (iv) gave written consent for the interviews, audio-taping of 50% of treatment sessions, and for access to their medical records. The presence of existing medical pathology, provided it was not a new diagnosis requiring further investigation, was not a study exclusion criterion. Those that were felt by their consultants to have a level of continuing major pathology that was too severe for them to take part in the study, including progressive cognitive impairment, terminal disorders, and any major comorbid pathology that would interfere with psychological treatment, those who were currently being actively investigated for significant

pathology suspected by the clinician and for whom cognitive behaviour therapy might confuse or cause distress, and those currently under psychiatric care were also excluded.

Assessments of health anxiety (HAI),[12] anxiety and depression (HADS),[13] health-related quality of life (EQ-5D),[14] and social function (SFQ)[15] were made at baseline and assessed independently by research assistants at 6m, 12m and 2 years. Health anxiety scores (HAI) were additionally recorded at 3 months. Service use data for the economic evaluation were collected at baseline, 6m, 12m and 2-year follow-ups using the Adult Service Use Schedule (AD-SUS), a self-report instrument assessed in interview and designed on the basis of previous economic evaluations in adult mental health populations,[18] and also by examination of computerised hospital records. ~~AD-SUS data were recorded at baseline, 6m, 12m and 2-year follow-ups.~~ Where AD-SUS data conflicted with the data obtained from records, the computerised records took precedence.

Statistical analysis

A sample size of 122 patients per group was needed to detect a CBT-HA/standard care score difference of 5.00 points[10] with 95% power at a two-sided 5% significance level assuming that the standard deviation for the change of HAI at 1-year is 7.58 points. Taking into account a possible rate of drop-out of 20% at 12 months, the estimated sample size was 152 patients. We also did a sample size calculation to demonstrate equivalence between CBT-HA and control in the main secondary outcome (total costs over 24-months) using data from the pilot study and with the hypothesis that ~~over a longer follow-up the reductions~~evidence of lower total ~~in~~ costs in the CBT-HA group seen in the pilot study would, over a longer follow-up, offset the cost of the therapy.[10] Assuming that the expected difference in mean cost is nil and the common standard deviation is £580, a sample size of 186 per group would have 80% power to declare that the cost of the CBT-HA and control groups were equivalent with a pre-specified equivalence margin of £150.[10] Equivalence would be declared if the 95% confidence interval falls within -£150~~97.50~~ and £150. Assuming a 20% dropout by 24

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months, 466 patients needed to be recruited. The main analysis was based on the intention-to-treat principle.

The primary endpoint was analysed using a mixed model with time, treatment, and time x treatment interaction as fixed effects, baseline measurement as covariate, and patient as random effect. The treatment differences at each time point including 12 months, together with its 95% confidence interval, were derived from the mixed model.

Missing data were treated as missing at random in the ~~above~~ mixed model analysis. To assess the sensitivity of the result to this assumption, the last observation carried forward (LOCF) strategy was used to compute the missing HAI at ~~during~~ the follow up visits. Other assessments were analysed in a similar way. In addition, covariate-adjusted analysis was performed on the primary outcome analysis by mixed model controlling for 3 pre-specified potential predictors for primary endpoint (clinical type, site and age).

Nationally applicable unit costs were applied to all elements of service use collected in the AD-SUS and from computerised hospital records,[19-21]~~,~~ including the cost of CBT.~~,~~ ~~although this~~ However, the cost of CBT was adjusted to reflect the salaries of the CBT-HA therapists employed in the study (). All unit costs were calculated and analysed in UK Pound Sterling for the financial year 2008-2009 ~~but are presented as international dollars using a conversion rate of 0.65 (www.eppi.ioe.ac.uk/costconversion)~~. Costs in the second year were discounted at a rate of 3.5%, as recommended by the National Institute for Health and Clinical Excellence.[22]~~.~~

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The economic evaluation included those patients for whom complete data at baseline, 12 and 24 months follow-up were available, with multiple imputation for missing data tested in sensitivity analysis.[23] Standard parametric tests were used as recommended for the analysis of cost data[24] with the robustness of the tests confirmed using bias-corrected, non-parametric bootstrapping.[25] ~~.~~Details of the cost-effectiveness analysis are in the web appendix.

Results

28,991 patients were screened during the 21 months of recruitment. 5769 patients (19.9%) of these scored 20 or over on the HAI, but many of these refused to take part or were not interviewed further for several reasons (Figure 1). This left 445 patients who were randomized but as one patient was mistakenly randomized twice, both times to standard care, the later set of data was discarded and only 444 were included in the trial (Figure 1). There were 9 deaths; 6 in the standard care group and 3 in the CBT-HA group. All deaths were due to natural causes in patients with pre-existing medical pathology. The mean number of CBT-HA treatment sessions was 6 (range 0-22), with 15 patients receiving no treatment. Patients allocated to CBT-HA improved rapidly after treatment and showed significantly greater reduction in health anxiety ~~at all assessment points~~ (Figure 2). These differences were highly significant at all assessment points, including at 12 ~~–~~ months, the ~~(~~primary outcome point) (~~D~~difference=2.98, 95% CI, 1.64 to 4.33, P<0.001). These differences were maintained in further analyses with site and baseline scores as covariates. At one year, 13.9% of the patients receiving CBT-HA had levels of health anxiety in the normal range (HAI score of 10 or less) compared to 7.3% in the control group. The results of health anxiety scores remained similar when the LOCF strategy was used to compute ~~the~~ missing HAI at ~~during the~~ follow ~~-~~ up visits (Appendix 1). We ~~have~~ also performed covariate adjusted analysis and the adjusted treatment effect on the primary endpoint was similar to the unadjusted effect (Appendix 2).

Patients in the CBT-HA group showed significantly greater improvement in self-rated anxiety and depression symptoms at 6 and 12 months, compared with standard care (Table 2). Social functioning and health-related quality of life showed no important change, apart from the visual analogue rating of quality of life, ~~that~~ which approached significance in favour of CBT-HA at 6 months.

Complete data for the economic evaluation were available for 343 patients (77%). We excluded one patient from the CBT-HA group who was classified as an outlier as a result of substantial hospital contacts due to a number of confirmed physical conditions (total 24-month cost £97,987 compared to an average per participant of £8,009 (SD 10,418) for the

total sample of 343), so the analysis is based on 342. We present here the results for our main economic hypothesis relating to equivalence of costs; full cost-effectiveness results are contained in the web appendix.

Total costs per patient over 24-months follow-up are detailed in Table 3. The mean cost of the CBT-HA intervention was £~~413~~ 421.51 per patient for a mean of 6 sessions (range £0 to £2,383). All other categories of cost, including GP contacts and hospital costs, were lower for the CBT-HA group than the control group. Total health and social care costs including the cost of the intervention were lower in the CBT-HA group (mean £7,314) than the control group (£7,727). In analyses adjusted for baseline cost however, the adjusted mean difference between the two groups was -£15~~5~~6 (95% CI -1,446 to 1,758~~ to 1,447~~, p=0.848)~~.;~~ ~~a~~Although equivalence was not achieved, there ~~is~~ was no evidence ~~that there is~~ of a significant difference in cost between the CBT-HA and control groups. Imputation of missing data did not alter this finding ~~(adjusted mean difference £113, 95% CI -1,539 to 930, p=0.630)~~.

Assessments of the fidelity of therapists' treatment showed that all except one scored at an adequate competence level or higher, and this was confirmed by the independent assessor (HW). The therapist who failed to achieve this level saw five patients. No serious adverse events attributable in any way to the trial intervention were identified in the study, but one participant in the standard care group made a serious suicide attempt.

Discussion

The results indicate that the previously noted effectiveness of CBT-HA[9-10,~~26~~28] generalises to patients with significant levels of health anxiety in a range of general medical clinics when delivered by therapists with little previous CBT experience but specifically trained to deliver treatment in these settings. The benefits of ~~treatment~~ CBT-HA in terms of anxiety were noted both in the short and longer~~-~~–term~~, and~~ were achieved with ~~equivalent~~ no significant difference in costs to usual care and with ~~clear~~ evidence of cost-effectiveness, in common with a recent paper demonstrating the cost-effectiveness of internet based cognitive

therapy for health anxiety[27]. Although equivalence in costs was not demonstrated, full economic data were only available for 73% of the required sample, so the study may have been underpowered for our cost hypothesis.

No evidence of the effectiveness of CBT-HA in terms of the secondary outcomes of social functioning or quality of life was evident, with a corresponding lack of evidence of cost-effectiveness in terms of QALYs (see web appendix). This might suggest...

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The findings from this pragmatic trial suggest that staff trained to deliver CBT-HA in medical clinics would help to relieve substantially troubling anxiety in a more cost-effective manner, compared to current standard approaches~~, when considering anxiety symptoms, though not quality of lifeway than current standard approaches~~. The finding that benefit was maintained over two years also suggests that without such intervention the morbidity of health anxiety persists, possibly because it is reinforced by continued reassurance and medical investigations. ~~As benefit was still marked after two years long after treatment had been completed the long-term savings on health care could be considerable.~~

The main strength of the study was the highly robust effect of treatment despite being given by relatively inexperienced staff who were trained only for the CBT-HA intervention. This suggests that this form of management could be incorporated into medical clinics and be administered by trained staff such as cardiac rehabilitation nurses and other specialist staff in other medical clinics who treat repeated attenders, many of whom have existing medical pathology but who suffer unduly from persistent and unnecessary worry over their health.

However, inclusion of patients with confirmed, chronic and recurring medical conditions may also have been a weakness in relation to our cost hypothesis, since the medical interventions received by these patients added to the variability of cost amongst the group and thus had a negative impact on the power available to detect equivalence of costs. Although it might have been expected that clear savings in costs would have accrued from a reduction in health anxiety, total costs reported include the cost of treating existing, chronic medical conditions, which may have hindered our ability to detect differences in cost that were due to health anxiety alone.

~~The main~~ A further weakness is that most of the patients who were ~~probably~~ potentially eligible for the study declined to take part and so the population treated may not be

representative. As many people with hypochondriasis and health anxiety attribute their bodily symptoms unequivocally to medical pathology[27,28] and therefore feel that only medical expertise can help them, there would need to be a change in attitudes, both from staff and patients, before the treatment could be given more widely. But if change does not occur, and standard medical care fails to be aware of health anxiety, an important, largely hidden, but eminently treatable, cause of morbidity in medical clinics is likely to persist.

Competing interests

HW and PS developed CBT-HA. The other authors declare that they have no competing interests.

Authors' contributions

The trial was initiated by PT and HT, who, with PS, MC, BB, SB, DM, SD, JG and SR, designed the structure of the trial. DW, BB and SB were involved in developing the statistical analysis plan, statistical analysis and results interpretation, and HP, BB and SB carried out the economic analyses. HT, SF, EM, and GS were therapy supervisors, HT, EM, GS, SF and HW checked fidelity of treatment, SC was the trial coordinator and organiser of the recruitment strategy. Aaron Beck, MD, acted as trial adviser. All authors read and approved the final manuscript.

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Trevor , Gemma Walker and Charlotte Watson in their roles as research assistants and supervisors in the study, and the 107 consultants who supported the study from its onset.

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Figure 2: Mean change in health anxiety score (±SE) by treatment

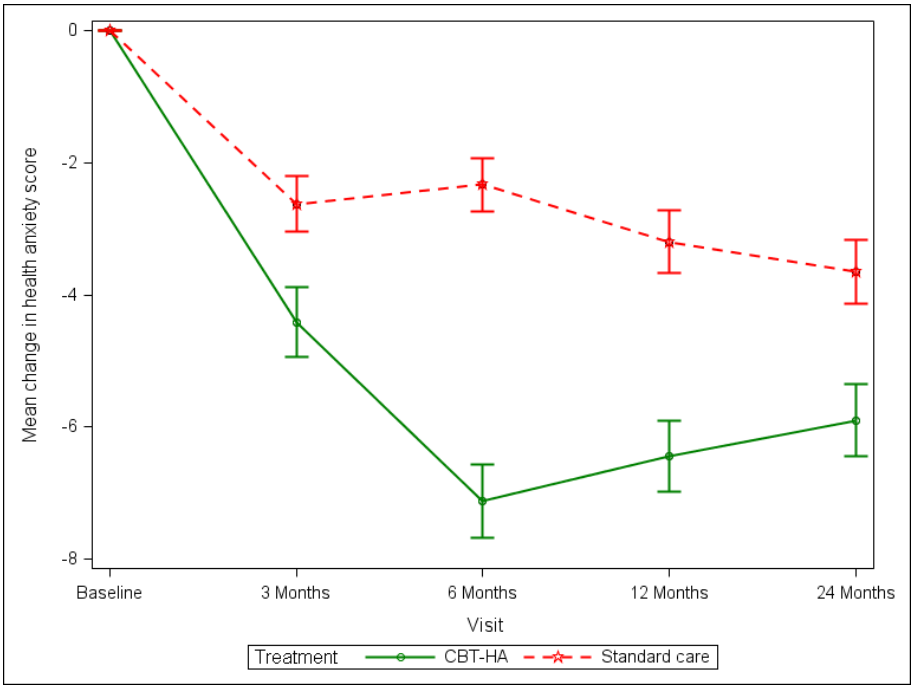

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Table 1: Baseline characteristics of patients

Characteristics	CBT-HA (N=219)	Standard Care (N=225)
Age (year)	50.3(13.6)	47.0(13.4)
Gender		
Female	113(51.6%)	123(54.7%)
Male	106(48.4%)	102(45.3%)
Ethnicity		
White British	145(67.8%)	151(68.0%)
White other	26(12.1%)	18(8.1%)
Black/Black British: African	6(2.8%)	9(4.1%)
Black/Black British: Caribbean	5(2.3%)	7(3.2%)
Asian/Asian British	15(7.0%)	23(10.4%)
Asian/Asian British: Other	8(3.7%)	8(3.6%)
Arab/Middle East	7(3.3%)	4(1.8%)
Chinese/Far East	2(0.9%)	2(0.9%)
Hospital		
Chelsea and Westminster Hospital, London	26(11.9%)	23(10.2%)
Charing Cross Hospital, London	31(14.2%)	26(11.6%)
Hillingdon Hospital, Middlesex	56(25.6%)	63(28.0%)
Kings Mill Hospital, Nottinghamshire	70(32.0%)	74(32.9%)
St Marys Hospital, London	36(16.4%)	39(17.3%)
Clinic type		
Cardiology	53(24.2%)	57(25.3%)
Endocrinology	41(18.7%)	43(19.1%)
Gastroenterology	77(35.2%)	72(32.0%)
Neurology	20(9.1%)	22(9.8%)
Respiratory medicine	28(12.8%)	31(13.8%)
HAI Score	24.9(4.2)	25.1(4.5)

Data are number (%) or mean (SD);

Table 2. Summary statistics and results from mixed model analysis of change in outcomes from baseline

		Summary statistics N, mean improvement from baseline (SD)		Results from mixed model analysis	
Outcomes	Visit	CBT-HA	Standard Care	Difference (95%CI)	P value
Health anxiety (HAI)	3 Months	205, 4.41 (7.63)	212, 2.62 (6.17)	1.79(0.48,3.10)	0.0076
	6 Months	197, 7.11 (7.83)	204, 2.33 (5.76)	4.86(3.53,6.18)	<.0001
	12 Months	194, 6.44 (7.47)	193, 3.20 (6.54)	2.98(1.64,4.33)	<.0001
	24 Months	190, 5.90 (7.54)	183, 3.66 (6.57)	2.05(0.70,3.41)	0.0030
Generalized anxiety (HADS-A)	6 Months	197, 2.74 (4.41)	204, 1.46 (3.89)	1.29(0.52,2.06)	0.0011
	12 Months	194, 2.80 (4.40)	192, 1.67 (4.04)	1.04(0.25,1.82)	0.0095
	24 Months	189, 3.33 (4.57)	181, 2.07 (4.35)	1.00(0.21,1.79)	0.0137
Depression	6 Months	197, 1.38 (4.32)	204, 0.51 (4.14)	0.78(-0.01,1.57)	0.0529
	12 Months	194, 1.43 (4.44)	192, 0.43 (3.69)	0.79(-0.01,1.59)	0.0527
	24 Months	189, 1.37 (4.95)	181, 0.51 (4.38)	0.63(-0.18,1.44)	0.1263
Social function	6 Months	197, 0.42 (4.46)	204, 0.39 (3.68)	0.14(-0.63,0.92)	0.7210
	12 Months	194, 0.57 (4.46)	192, 0.39 (3.65)	0.19(-0.60,0.98)	0.6364
	24 Months	190, 1.06 (4.76)	182, 0.83 (3.81)	0.21(-0.58,1.01)	0.6002
Health-related quality of life (EQ-5D scores)	6 Months	196, 0.04 (0.33)	203, 0.04 (0.35)	-0.00 (-0.06,0.06)	0.9921
	12 Months	194, 0.08 (0.34)	191, 0.08 (0.35)	-0.00 (-0.06,0.06)	0.9736
	24 Months	189, 0.08 (0.32)	181, 0.07 (0.34)	0.02 (-0.04,0.08)	0.5075
Health-related quality of life (EQ-5D visual analogue scale)	6 Months	189, 6.04 (29.94)	194, 2.33 (23.65)	4.32 (-0.27,8.90)	0.0649
	12 Months	185, 7.06 (29.12)	184, 5.72 (25.20)	1.56 (-3.10,6.21)	0.5121
	24 Months	183, 9.29 (30.43)	172, 5.81 (23.42)	4.06 (-0.67,8.79)	0.0923

Table 3. Mean total cost (£) per patient over 24 months follow-up

	CBT-HA (N=172) Mean (SD)	Standard care (N=170) Mean (SD)	Mean difference	Adjusted mean difference*	95% CI*	p-value*
CBT-HA	421.51 (308.25)	0.00 (0.00)	421.51			
General Practitioner contacts	381.34 (428.83)	417.64 (586.74)	-36.30			
Other Community health and social care contacts	392.68 (976.43) ~~774.02 (1153.36)~~	473.89 (392.68) ~~891.53 (16439.54)~~	-81.21 ~~-117.50~~			
Medication	2037.33 (2760.75)	2376.74 (4487.03)	-339.41			
Hospital services	3946.81 (5583.89)	4223.31 (6353.28)	-276.50			
Service provided accommodation	134.52 (1025.45)	235.83 (1640.25)	-101.31			
Total	7314.20 (7429.58)	7727.40 (8324.58)	-413.20	-155.86	-1,446.20~~-1757~~ to 1,757.93~~1446.20~~	0.848
~~Total with missing data imputed~~	~~7594.89 (7255.25)~~	~~7707.91 (8324.58)~~	~~-113.02~~	~~-304.70~~	~~-1539.03 to 929.64~~	~~0.630~~

*Applying bootstrapped costs and adjusted for baseline costs

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